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10/655,901	09/05/2003	Youichi Akasaka	2460	7660
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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/655,901
Filing Date: September 05, 2003
Appellant(s): AKASAKA, YOUICHI

Kyle J. Way
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed May 02, 2006 appealing from the Office action mailed 2/10/06.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,344,922	Grubb	2-2002
6,603,593	Fidric	9-2001

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Fludger et al. "Pump to Signal RIN Transfer in Raman Fibre Amplifiers" Electronics Letters, vol37, no. 1 (Jan 4, 2001), pp. 15-17.

Agrawal, Govind P. Fiber-Optic Communication Systems. 3rd Edition. Wiley Interscience. May 28, 2002. pp. 243-246.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 4, 11, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grubb (US 6,344,922 published Feb. 5, 2002) in view of Fludger (Pump to Signal RIN transfer in Raman Fibre Amplifiers, 2001).

**The references made herein are done so for the convenience of the applicant. The prior art should be considered in its entirety.

With regard to claim 1, Grubb discloses a communication system (fig. 5a) for distributed Raman amplification of optical signals (col. 2, lines 28-42), the communication system comprising:

- a first fiber span (1st instance of #30);
- a second fiber span (2nd instance of #30);
- and an amplifier system (2nd instance of #24, #26 and #31₁-#31_n)

configured to:

- o generate a first light beam (multiplexed via 2nd instance of #26; pumps #31₁-#31_n);

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- split (via 2nd instance of #24) the first light beam into a first portion of the first light beam (coupled via 3rd instance of #26) and a second portion of the first light beam (coupled via 4th instance of #26);
- transfer the first portion of the first light beam onto the first fiber span to backward propagate over the first fiber span (first portion counter-propagates in 1st instance of #30);
- and transfer the second portion of the first light beam onto the second fiber span to forward propagate over the second fiber span (2nd portion co-propagates in 2nd instance of #30).

Further, Grubb discloses that the pump power can be varied (col. 5, lines 10-15).

However, Grubb does not specifically disclose an unequal power distribution between the forward and counter propagating pumps. Fludger teaches the effects of pump propagation direction on RIN transfer (entire article). It would have been obvious to one of ordinary skill (e.g., an optical engineer) in the art at the time the invention was made to unequally distribute the power of the forward and backward propagating signals for the advantage of minimizing RIN transfer.

With regard to claim 4, col. 12, line 35 discloses the claimed gain.

Claims 11 and 14 are merely the method of normal operations of the apparatus as claimed.

Claims 5-6, 8, 15-16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grubb (US 6,344,922 published Feb. 5, 2002) in view of Fludger

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(Pump to Signal RIN transfer in Raman Fibre Amplifiers, 2001), as applied to claims 1 and 14 above, and further in view of Fidric (US 6,603,593 published Sep. 19, 2001).

With regard to claims 5 and 16, Grubb in view of Fludger does not specifically disclose that a laser diode is configured to generate the first light beam. However, laser diodes as Raman pump sources are well known in the art. Further, it is taught by Fidric (col. 3, lines 20-25). It would have been obvious to one of ordinary skill (e.g., an optical engineer) in the art at the time the invention was made to use a laser diode as a Raman pump source for the advantage of an inexpensive and readily available art-recognized pump source.

With regard to claims 6, 8, 15, and 18, Grubb in view of Fludger does not specifically disclose that the splitter is a 3dB splitter. However, Fidric teaches the use of a 3dB splitter (#20). It is well-known in the art that a 3dB splitter is so named because an equal division (50/50) of an input signal between two output ports causes a 3dB loss. It would have been obvious to one of ordinary skill (e.g., an optical engineer) in the art at the time the invention was made to use a 3 dB splitter for the advantage of an inexpensive readily available splitter to even distribute the pump power signal.

Claims 7, 9-10, 17, and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grubb (US 6,344,922 published Feb. 5, 2002) in view of Fludger (Pump to Signal RIN transfer in Raman Fibre Amplifiers, 2001) as applied to claims 1 and 14 above, and further in view of Agrawal (Fiber-Optic Communication Systems, 2002).

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Grubb does not specifically disclose the claimed transmission fiber lengths or pump powers. However, Grubb discloses that one of ordinary skill in the art may construct an amplifier with a desired signal amplification range by varying the length and the pump powers. Further, Agrawal explicitly teaches these relations (pg. 244 - equations 6.3.2 and 6.3.3; pg. 245 - equation 6.3.5). It would have been obvious to one of ordinary skill (e.g., an optical engineer) in the art at the time the invention was made to merely apply the explicit relations of Agrawal to the amplifier of Grubb for the advantage of optimizing amplification to achieve the desired signal amplification range.

(10) Response to Argument

With regard to the preliminary discussion of the Fludger reference, applicant argues the following:

- (A) “However, while Fludger discusses RIN transfer characteristics of systems employing *either* co-pumped *or* counter-pumped Raman amplifiers, at no point does Fludger address the effect on RIN if *both* forward *and* reverse pumping are performed simultaneously on the same fiber span.” (pg. 6, section I, lines 10-14; emphasis in original text).

With regard to the 103(a) rejection of claims 1, 4, 11, and 14 as being unpatentable over Grubb in view of Fludger, applicant argues the following:

- (B) “...Fludger does not teach or suggest the possibility of forward and backward pumping simultaneously, much less unequal forward and backward pumping.” (pg. 7, lines 5-7)

- (C) No combination of Grubb and Fludger teach “a power of the first portion of the first light beam is not equal to a power of the second portion of the first light beam,” or “a power of the first portion of the second light beam is not equal to a power of the second portion of the second light beam,” as provided for in claims 1 and 11 because “Grubb does not appear to teach or suggest an uneven split of a single light beam” and “...Fludger is focused on determining RIN over a single fiber span...” (pg. 8, lines 3-10).
- (D) No motivation exists to combine Grubb and Fludger because Fludger teaches away from simultaneous forward and reverse pumping. (pg. 8, 1st paragraph under section B).

Arguments (A), (B), and (D) are not convincing because *simultaneous* forward and backward pumping is not claimed.

Argument (C) is not convincing because an “uneven split of single light beam is not claimed” and further, the Examiner explicitly indicated the disclosures of Grubb, which teach the splitting of the light beams, and power variations of the pump beam (see pg. 3, lines 3-5 and line 12 of Final Office Action dated 2/10/06).

Further, applicant's statement that “Fludger is focused on determining RIN over a single fiber span...” is simply incorrect. Please note Fludger's explicit statements regarding the “performance of the *transmission system*” (pg. 16, col. 2, 1st line of 1st full paragraph; emphasis mine) and “...RIN transfer will accumulate linearly as the number of spans increases...” (pg. 17, col. 1, lines 4-8) and further “...an analysis of *system impairment* owing to RIN transfer...” (pg. 17, col. 1, line 14; emphasis mine).

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Consequently, applicant's assertion that "Fludger is focused on determining RIN over a single fiber span" is not supported by the cited Fludger document.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,


Deandra M. Hughes

Conferees:

Thomas Black 

Mark Hellner

